

What is claimed is:

1 1. A method comprising:
2 dividing an input signal into a plurality of time-
3 overlapping windows;
4 transforming time-overlapping windows so as to create
5 a plurality of frequency-transformed windows;
6 processing selected ones of the frequency-transformed
7 windows;
8 adding processed frequency-transformed windows to form
9 a frequency-domain resultant; and
10 converting the frequency-domain resultant into a time-
11 domain resultant.

1 2. A method as defined in Claim 1, further
2 comprising:
3 selecting frequency-transformed windows for processing
4 in accordance with reverberation paths, wherein
5 each of the reverberation paths is associated
6 with a respective delay.

1 3. A method as defined in Claim 2, further
2 comprising:
3 selecting a frequency-transformed window that
4 incorporates a time shift that is closest to the
5 delay to the reverberation path.

1 4. A method as defined in Claim 1, wherein
2 processing selected ones of the frequency-transformed
3 windows comprises applying a first filter that corresponds
4 to a reverberation path.

1 5. A method as defined in Claim 4, wherein the first
2 filter effects a frequency-dependent attenuation that
3 corresponds to a respective reverberation path.

1 6. A method as defined in Claim 5, wherein
2 processing selected ones of the frequency-transformed
3 windows further comprises applying a head-related transfer
4 function.

1 7. A method as defined in Claim 6, wherein the head-
2 related transfer function corresponds to a respective
3 reverberation path.

1 8. A method as defined in Claim 7, wherein the head-
2 related transfer function corresponds to positional
3 coordinates of the reverberation path.

1 9. An apparatus comprising:
2 an input stage to couple to a source of input signals
3 and to divide an input signal into timewise-
4 overlapping windows;
5 a frequency transform module coupled to the input
6 stage to transform each of the timewise-
7 overlapping windows into a respective frequency-
8 transformed window; and
9 a processor to select frequency-transformed windows
10 and to filter each of the selected windows in
11 accordance with a respective filter so as to
12 produce a filtered frequency-transformed window.

1 10. An apparatus as defined in Claim 9, wherein the
2 processor is adapted to select frequency-transformed
3 windows by matching a frequency-transformed window to a
4 source image.

1 11. An apparatus as defined in Claim 10, wherein a
2 source image corresponds to a reverberation path of an
3 audio signal.

1 12. An apparatus as defined in Claim 10, further
2 comprising:

3 a table to store a plurality of transfer functions,
4 each of the transfer functions corresponding to
5 at least one source image

1 13. An apparatus as defined in Claim 12, wherein a
2 source image corresponds to a reverberation path of an
3 audio signal.

1 14. An apparatus as defined in Claim 13, wherein each
2 of the transfer functions is a head-response transfer
3 function that corresponds to a reverberation path.

1 15. An apparatus as defined in Claim 10, further
2 comprising:
3 a combiner coupled to the processor to receive a
4 plurality of the frequency-transformed windows
5 and to provide combined windows at an output; and
6 an inverse frequency transform module coupled to an
7 output of the combiner to transform combined
8 windows into the time domain.

1 16. An apparatus as defined in Claim 12, wherein the
2 processor comprises a plurality of source-image processors,
3 wherein each source-image processor:

4 (i) is coupled to receive a frequency-transformed
5 window that is matched to a respective source
6 image;
7 (ii) is coupled to the table to receive a transfer
8 function associated with a respective source
9 image; and
10 (iii) is coupled to receive filter coefficients that
11 correspond to the respective source image.

1 17. An article comprising a machine-readable storage
2 medium containing instructions that, if executed, enable a
3 system to:
4 divide an input signal into a plurality of time-domain
5 windows;
6 transform each of the time-domain windows into the
7 frequency domain so as to create a plurality of
8 frequency-transformed windows;
9 process selected ones of the frequency-transformed
10 windows;
11 combine the processed frequency-transformed windows to
12 form a frequency-domain resultant; and
13 convert the frequency-domain resultant into a time-
14 domain resultant.

1 18. An article as defined in Claim 17, further
2 comprising instructions that, if executed, enable the
3 system to:
4 select frequency-transformed windows for processing in
5 accordance with one or more source images.

1 19. An article as defined in Claim 18, further
2 comprising instructions that, if executed, enable the
3 system to select frequency-transformed windows for

4 processing by matching a frequency-transformed window to a
5 delay corresponding to a respective source image.

1 20. An article as defined in Claim 18, further
2 comprising instruction that, if executed, enable the system
3 to filter the frequency-transformed window in accordance
4 with parameters that are derived from the source image.

1 21. An article as defined in Claim 20, further
2 comprising instructions that, if executed, enable the
3 system to filter the frequency-transformed window in
4 accordance with a Head Response Transfer Function that
5 corresponds to the source image.

1 22. A spatial audio rendering engine comprising:
2 an input stage to divide an input signal into
3 timewise-overlapping windows;
4 a transform module to transform each of the timewise-
5 overlapping windows into a frequency-transformed
6 window;
7 a plurality of source image processing kernels, each
8 of the kernels to process a transformed window in
9 accordance with parameters corresponding to a
10 source image; and
11 an inverse transform module coupled to the source
12 image processing kernels to provide a time-domain
13 signal derived from frequency-transformed windows
14 processed by the processing kernels.

1 23. A spatial audio rendering engine as defined in
2 Claim 22, wherein the source image processing kernels are
3 constructed to process selected frequency-transformed
4 windows in accordance with filter functions that correspond
5 to respective ones of the source images.

1 24. A spatial audio rendering engine as defined in
2 Claim 23, further comprising a plurality of Head Related
3 Transfer Functions to selectably coupled to respective ones
4 of the source image processing kernels for filtering a

5 transformed windows in a manner that simulates the response
6 of a human ear to the respective source image provided to
7 an audio display device.

1 25. A spatial audio rendering engine as defined in
2 Claim 23, wherein source image processing kernels are
3 constructed to process frequency-transformed windows that
4 are time-delay matched to respective source images.

1 26. A spatial audio rendering engine as defined in
2 Claim 25, further comprising:
3 a signal combiner coupled to outputs of source image
4 processing kernels to provide an output window
5 representing a combination of the outputs of the
6 source image processing kernels.

1 27. A spatial audio rendering engine as defined in
2 Claim 26, further comprising:
3 an inverse transform module coupled to the signal
4 combiner to transform the output window signal to
5 a time-domain signal.

1 28. A spatial audio rendering engine as defined in
2 Claim 27, further comprising:

3 an interleave module coupled to the inverse transform
4 module to provide an output signal to an audio
5 display device.

1 29. A system comprising:
2 a spatial audio rendering engine comprising:
3 an input stage to couple to a source of input signals
4 and to divide an input signal into timewise-
5 overlapping windows;
6 a frequency transform module coupled to the input
7 stage to transform each of the timewise-
8 overlapping windows into a respective frequency-
9 transformed window; and
10 a processor to select frequency-transformed windows
11 and to filter each of the selected frequency-
12 transformed windows in accordance with a
13 respective filter so as to produce a filtered
14 frequency-transformed window; and
15 an audio display device.

1 30. A system as defined in Claim 29, further
2 comprising:
3 a buffer coupled to the frequency transform module to
4 store respective ones of the frequency-
5 transformed windows.